What is Claimed is:

1. A control unit for a multi-cylinder spark ignition-type engine in which a combustion cycle of each cylinder has a predetermined phase difference, said engine including: an inter-cylindrical gas passage between a pair of cylinders, an exhaust stroke of one of the cylinders and an intake stroke of the other of the cylinders overlapping each other, and through the inter-cylindrical gas passage, burnt gas discharged from the preceding cylinder at the exhaust stroke being introduced into the following cylinder at the intake stroke; a switching valve for switching the direction in which the burnt gas of the preceding cylinder is introduced, from the side of an exhaust passage to the side of the inter-cylindrical gas passage and vice versa; and a fresh-air introducing valve for introducing fresh air into the following cylinder by opening and closing a fresh-air introduction passage; said control unit comprising:

an operation-mode controlling means for executing control of a special operation mode in a partial load range of the engine, in said special operation mode, the fresh-air introducing valve being closed and the switching valve being controlled so that the whole burnt gas discharged from the preceding cylinder can be introduced into the side of the inter-cylindrical gas passage, thereby the two cylinders being kept connected, the air-fuel ratio in the preceding

cylinder becoming a lean air-fuel ratio, higher than a stoichiometric ratio and combustion being conducted, and fuel being supplied to the burnt gas having the lean air-fuel ratio introduced from the preceding cylinder into the following cylinder to conduct combustion in the following cylinder; and executing control of a medium operation mode in a higher load range than the partial load range, in said medium operation mode, the fresh-air introducing valve being opened to introduce both the burnt gas and fresh air into the following cylinder and fuel being supplied to conduct combustion in the following cylinder; and

an air-fuel-ratio controlling means for controlling the air-fuel ratio in the following cylinder so that the concentration of oxygen in exhaust gas discharged from the following cylinder can be a value corresponding to a combustion state at a stoichiometric ratio.

2. The control unit for the spark ignition-type engine according to claim 1, wherein

in the partial load range of the engine in which control of the special operation mode is executed, an increase in an engine load changes the air-fuel ratio in the preceding cylinder from a lean air-fuel ratio toward a stoichiometric ratio; and

control of the medium operation mode is executed on a higher load side than an operation area where the air-fuel

ratio in the preceding cylinder has become the stoichiometric ratio, in the medium operation mode, the air-fuel ratio in the preceding cylinder being set to the stoichiometric ratio and the switching valve being controlled so as to come to a neutral position where the burnt gas discharged from the preceding cylinder is distributed to both the exhaust-passage side and the inter-cylindrical gas-passage side.

3. The control unit for the spark ignition-type engine according to claim 2, wherein:

control of an ordinary operation mode in which combustion is individually conducted in each cylinder is executed in a higher-load or higher speed operation area than an operation area in which control of the medium operation mode is executed; and

in the ordinary operation mode, the fresh-air introducing valve is opened and the switching valve is controlled so that the whole burnt gas discharged from the preceding cylinder can be introduced onto the exhaust-passage side.

4. The control unit for the spark ignition-type engine according to claim 3, wherein in an operation area in which control of the medium operation mode is executed, an opening level of the switching valve is changed so that the quantity of burnt gas introduced into the exhaust-passage side can

increase gradually according to an increase in an engine load.

5. The control unit for the spark ignition-type engine according to claim 4, wherein the switching valve is configured by a turn-type valve disposed at a part where the inter-cylindrical gas passage and the exhaust passage are connected.